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1896. Thirty-seven courses of instruction will be offered in fourteen departments.

THE announcement is issued of the Fifth Annual Summer School at the University of Minnesota for the four weeks between July 27th and August 21st. The school is organized in two sections: University and Elementary. The University section offers 19 courses, of which 10 are in the Sciences, as follows :

Botany, Prof. MacMillan,2 Courses.
Chemistry, Prof. Frankforter,.....2 Courses.
Physics, Prof. Jones,.....2 Courses.
Physiography, Mr. Goode,.....2 Courses.
Physiology, Prof. Nachtrieb,.....1 Course.
Physiological Psychology, Mr. Gale,...1 Course.

Special courses of lectures will be delivered daily. Four Educational Congresses will hold sessions during the month, viz.: Institute instructors; State Normal School officers; City Superintendents, and the Society for Child Study. The School is authorized under the authority and supervision of the State Department of Public Instruction. Tuition is free.

PROF. HAROLD B. SMITH, at present professor of electrical engineering in the Purdue University, Lafayette, Ind., has been elected to a new chair of electrical engineering, established in the Worcester Polytechnic Institute.

AMERICAN students going abroad for the summer may be interested to know that there will be held at Jena, from the 3d to the 15th of August, a *Ferienkurse*, including lectures on astronomy, botany, physics, zoölogy, hygiene, physiology, psychology, philosophy, pedagogy, modern languages, literature and history.

A COURSE of lectures on colonial botany is offered during the present summer semester at the Botanical Garden and Museum of Berlin, by Profs. Engler, Schumann, Volken and Urban, and Drs. Warburg, Gilg, Lindau, Perling, Dammer and Gürke. The course occupies two hours per week and is given without charge.

WE learn from the *Academische Rundschau* that a regulation has been issued allowing women to attend lectures at the University of Berlin after securing permission from the Minister of Public Instruction and the instructor. The University of Munich has given one woman

permission 'experimentally' to attend courses in geology and paleontology. Special courses for women, which include botany, physics and chemistry, have been arranged at the University of Göttingen.

THE sum of 460,000 Marks has been appropriated by the government for the construction of a library building for the University of Freiburg.

DISCUSSION AND CORRESPONDENCE.

PRINCIPLES OF MARINE ZOÖGEOGRAPHY.

PROF. THEO. GILL* has given a very interesting comparison of his own views of zoögeographical division of the earth's surface, especially of the oceans, and those set forth by myself in my 'Grundzüge der Marinen Tiergeographie.' This comparison is the more interesting since we agree in many points with each other. Nevertheless, there are some differences which, as Prof. Gill very properly states, are chiefly due to the different starting points. The discussion is consequently directed at once in a particular direction, and upon this I wish to lay the greatest stress: namely, upon the difference between my method of investigation and that generally employed hitherto. While the method of Prof. Gill, and of almost all the other students of zoögeography, is an inductive one, *i. e.*, constructing zoögeographical divisions according to the actual distribution of animals, I make use of the deductive method, considering merely the physical laws that govern the distribution of animals. In what follows I shall state briefly the reasons which have induced me to urge a change in the method of zoögeographical research.

1. Our knowledge of the actual distribution of marine animals is extremely incomplete; we do not know the exact limits of the range of *most* of the species, so that it is impossible at present to get a correct idea of the general features of their distribution, and of the assemblage of the different forms of animals in any particular locality.

2. We cannot derive any divisional limitations of general value from a particular group

* Science N. S. III., No. 66, April 3, 1896, p. 514-516.

of animals, since each group is subject to different laws. Thus a division obtained by the study of the prevailing conditions in one group is often exactly the opposite of that found to prevail in other groups. From this disagreement arose the continuous dispute between different writers with regard to the number and the limits of the zoögeographical divisions, each wishing to transfer the results obtained in his favorite group to other groups.

3. The actual distribution of animals is the result of development during the course of the geological history of the earth. While many animals show a distribution which corresponds to the physical conditions of recent times, many others point clearly to conditions of former periods, and their distribution is only intelligible under the supposition that formerly different conditions prevailed on the earth.

Thus we should expect that investigations founded on the actual distribution of animals are in the first place incomplete, and in the second the results obtained are contradictory in many cases. In order to overcome the latter difficulty, statistical lists of the distribution of these animals have been prepared showing which distributional features are most common. But I object even to these statistics. My first reason shows clearly that such statistics never are complete, and it is very dangerous in science to rely upon statistics deficient in the main quality by means of which they are useful at all.

From these considerations I am induced to use the deductive method, and to construct zoögeographical divisions according to the differences in the physical conditions influencing the distribution of animals. But I remark expressly, I do not regard such a division of the earth as the final aim that should be reached in zoögeography, but only as a means which facilitates zoögeographical study. My divisions represent only a *rough sketch of the distribution of the different conditions of life in recent time*. Of course, these divisions do not agree with those assigned to animals the range of which is due to conditions belonging to former times; but even in such cases my divisions have a decided advantage. If there are any exceptions in the actual distribution of certain forms we see at once

that these animals do not follow the general rules according to which the divisions are conceived, and the knowledge that certain laws do *not* control particular cases is a considerable advantage in revealing the true causes of these peculiarities. For the whole point or aim of zoögeographical research is to find out the *causes of the distribution* of each animal form.

The above reasons, I think, are sufficient to demonstrate that my starting point has certain advantages over that of other students in zoögeography. Notwithstanding the results of my investigations are very similar to these obtained by Prof. Gill. This is due, I believe, to the extensive and correct character of his preliminary work, to the exact and fundamental study of the actual distribution of certain groups of animals, and to the full use he has made of the known facts. On the other hand, I think, Prof. Gill's method is not so fundamentally different from mine as it seems to be perhaps according to his own statement. It is true he 'prefers the inductive method' (p. 515), and his divisions are adapted in some degree to the actual distribution of certain animals; nevertheless his chief marine divisions are conceived according to a *physical* principle, to the *temperature* of the ocean waters, a principle which was first introduced by Dana, and the importance of which is recognized by Prof. Gill in the concise sentence: "Temperature is a prime factor, and land a secondary, in the distribution of marine animals."* On this point our opinions agree completely, and thus, I think, our starting points are not so extremely different, since Prof. Gill in constructing his zoögeographical divisions of the seas pays due attention to temperature, which is at least one, and indeed the most important, physical factor.

With regard to the objections of Prof. Gill to my life districts, I should like to add here that I do not fully understand why he says they are misconceived, since they are framed in contravention of my own principle of continuity. If all the life districts were continuous, any further divisions would be impossible and needless, as is the case in the abyssal (bassalian) district, and even the discontinuity of the others obliges

*Presidential Address Biol. Soc. Washington, Jan. 19, 1883, p. 39.

us to make further divisions so as finally to reach continuous and consistent areal units. I formed my division into life districts according to the primary conditions of life, and I never claimed that all the localities on the earth showing the same primary conditions of life should be continuous; I only claimed that the smallest areal units of zoögeographical division should be continuous. Different conditions of life have existed since the beginning of the geological history of the earth; the secondary divisions into regions of the marine life districts, which were formerly continuous in a greater or less degree, are made according to the topographical continuity, which was interrupted by the introduction of climatic differences in much later times. The assigned districts of life are old, and during a long time they were the only zoögeographical divisions of the seas. The different regions of the life districts are of a comparatively recent date, and their existence did not begin until a differentiation of climate took place.

Prof. Gill further suggests that the life districts themselves are of unequal value, and they should be segregated into two primary categories, marine and inland. I agree perfectly with this view, as the same view is maintained in my book, the title of which reads: '*Principles of marine zoögeography*,' thus leaving out of view the consideration of *inland* districts. Further, I expressly state (p. 18-20) that the diagnostic value of my five life districts differs, for if we were to establish a perfectly philosophical division we should have to introduce other districts, but only the five named are of *practical* value. The fact that the marine life districts are unequal as regards the number of subdivisions I cannot consider as an objection to their correctness. Indeed, in this respect they *are* unequal, but if they are unequal in nature why should we try to correct nature in proposing a scheme on paper in which the divisions would appear more equal than they really are?

I am glad that Prof. Gill by his remarks has given me an occasion to state again in a concise form my reasons for neglecting the inductive or statistical method in zoögeography. I think that practical results favor my method, es-

pecially since there is a remarkable parallelism in both divisions, Prof. Gill's and mine. This fact suggests that an agreement of both is at least possible, and then, perhaps, some of the scientific terms of Prof. Gill would have the priority and should be used, as most of the terms used by me are certainly in that particular sense of more recent date.

ARNOLD E. ORTMANN.

PRINCETON COLLEGE, May, 1896.

'THE CHILD AND CHILDHOOD IN FOLK-THOUGHT.'

TO THE EDITOR OF SCIENCE: In the issue of March 27th Dr. Brinton has dwelled on the literary merits of Dr. A. F. Chamberlain's book '*The Child and Childhood in Folk-Thought*.' As, aside from its literary aspirations, the book is intended as a contribution to Anthropological Science, I may be permitted to add a few words from this point of view.

Dr. Brinton has well said that the book represents a vast amount of compilatory work. The author deserves our thanks for having delved in numerous odd books in which we should hardly expect to find information on the subject of childhood, and for having extricated a considerable number of references from ethnological literature. He has thus largely increased the available material on studies of childhood. These references he has conveniently arranged in a bibliographical index.

While this preparatory work is very meritorious, particularly in so far as it refers to uncommon books, the attempt at a scientific arrangement of the material thus obtained does not appear successful. If scientific description was the author's aim it was incumbent upon him to arrange his material from certain points of view in a systematic way. If he desired by inductive methods to investigate certain phenomena it was his duty to array his facts for the purpose of finding the elements common to all of them. His book fills neither the one nor the other requirement.

A characteristic instance of lack of organic connection is the seventh chapter, '*Affection for Children*.' The subject-matter treated is as follows: Parental love, the dead child, motherhood and infanticide, the dead mother, fatherly